

**COURSE DATA****Data Subject**

|                      |                |
|----------------------|----------------|
| <b>Code</b>          | 33989          |
| <b>Name</b>          | Food Additives |
| <b>Cycle</b>         | Grade          |
| <b>ECTS Credits</b>  | 4.5            |
| <b>Academic year</b> | 2019 - 2020    |

**Study (s)**

| <b>Degree</b>                                | <b>Center</b>                         | <b>Acad. Period</b> |
|--|---------------------------------------|---------------------|
| 1103 - Degree in Food Science and Technology | Faculty of Pharmacy and Food Sciences | 4 First term        |

**Subject-matter**

| <b>Degree</b>                                | <b>Subject-matter</b> | <b>Character</b> |
|--|-----------------------|------------------|
| 1103 - Degree in Food Science and Technology | 37 - Food additives   | Optional         |

**Coordination**

| <b>Name</b>                      | <b>Department</b>  |
|----------------------------------|--|
| GAMERO LLUNA, MARIA DESAMPARADOS | 265 - Prev. Medicine, Public Health, Food Sc.,Toxic. and For. Med. |
| OROZCO VALVERDE, MARIA ELENA     | 265 - Prev. Medicine, Public Health, Food Sc.,Toxic. and For. Med. |

**SUMMARY**

Food Additives is an elective subject for fourth course of Science and Food Technology, which is taught in the Faculty of Pharmacy, University of Valencia. This course has a total of 4.5 ECTS taught in the first quarter.

Food additives are a basic and indispensable tool in food manufacturing. There is now a wide variety of additives, which would be impossible to be virtually impossible to obtain optimal food production, with security guarantees hygienic and quality standards currently require. Among the most important groups of additives include antioxidants, antimicrobials, colorants, sweeteners, flavor enhancers, thickeners and gelling agents, emulsifiers and so on. The overall objective of the subject is precisely to present the



different types of additives and processing aids used in the food industry as well as their roles and rules of use. Therefore most of the course is devoted to describing the composition, characteristics most important roles in food and rules of use of each of the additive groups above mentioned. In addition, the graduate in Science and Technology Food should have knowledge about general questions such as the definitions of additives and processing aids and learn to differentiate its. Another object of this course is to provide knowledge about the toxicology studies leading to authorization of an additive, issues of safety and labeling and other issues surrounding the legislation of additives. Thus the subject of food additives listed as one of the educational content of interest that must exist within the degree of Science and Food Technology.

## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

### Other requirements

To study the subject is of interest to have basic knowledge of chemistry and biochemistry of foods that will allow them to understand the theoretical concepts of food additives, the composition of these, the mode of action and the food processing.

## OUTCOMES

### 1103 - Degree in Food Science and Technology

- Know the role of food additives in the design and innovation of new food ingredients, products and processes.
- Know the additives arising from new knowledge on their natural sources or resulting from food biotechnology.
- Know the methods used for the manufacture of additives.
- Know the toxicological aspects of additives.
- Know legislation on additives.

## LEARNING OUTCOMES

### SKILLS TO ACQUIRE

Understand and critically evaluate the role of food additives in the design and innovation of new ingredients, food products and processes.

Understand and critically evaluate the general aspects of the use of additives and processing aids such as definitions and classification of additives and processing aids



Knowing the composition, physicochemical characteristics and the most important functionality of the different types of permitted additives and processing aids in food processing and manufacturing.

To know toxicological studies required for the authorization of additives, use legal criteria, safety aspects, positive lists, labeling agencies to perform these functions as well as other issues related to additives legislation.

#### **SOCIAL SKILLS AND ABILITIES**

Critical thinking that allows them to argue and defend judgments with integrity and tolerance.  
Ability to work individually and in groups, in concert.

Ability to apply knowledge to practice.

Ability to build a written or an oral form understandable and organized

## **DESCRIPTION OF CONTENTS**

### **1. Introduction**

Topic 1. Introduction to the subject. Some milestones of the use of food additives. Definitions of additive and processing aid and differences. Benefits of the use of additives. Conditions of employment and food security.

### **2. Additives for conservation**

Topic 2. Antioxidant additives. Autoxidation: autoxidation reactions, preventive measures. Classification of antioxidants: natural and synthetic. Applications and examples.

Topic 3. Additives antimicrobials. General comments. Classification of preservatives, mineral and organic preservatives. Applications and Examples.

Topic 4. pH control agents. General comments. Additives used as pH control agents and classification. Applications and examples.

Topic 5. Additives used in bakery. General comments. Types of additives used in bakery: emulsifiers, wetting agents and enzymes. Applications and Examples

### **3. Additives for organoleptic effects**

Topic 6. Flavorings and flavor enhancers. Overview flavorings. Classes flavors: natural, concentrated aromas, synthetic nature-identical and synthetic. Biotechnological advances in the production of aromas. Overview of flavor enhancers. Classes flavor enhancers. Applications and examples.

Topic 7. Sweeteners. Overview sweeteners. Types of sweeteners: nutritive and low-power sweeteners



no nutritive and high-power sweeteners. Applications and examples.

Topic 8. Dyes. Overview dyes. Classification of dyes: natural, synthetic but identical to naturals, natural extracts and synthetic. Applications and examples.

Topic 9. Thickeners and gelling agents. General comments. Classification: seaweed extracts, seed extracts, plant extracts, extracts of cereals, vegetable products extracts, extracts of microorganisms. Cellulose derivatives. Applications and examples.

Topic 10. Emulsifiers. General comments. Classification: natural and semi synthetic. Applications and examples.

#### **4. Manufacturing aids: enzymes**

Topic 11. Manufacturing aids. Enzymes. General comments and classification of manufacturing aids. Enzymes. Health and legal aspects of using enzymes. Applications of enzymes in the food industry.

#### **5. Toxicological evaluation and legislation**

Topic 12. Toxicological evaluation. Justification for the use of additives: the need and safety. Toxicological evaluation of additives. Daily intake (ADI). Labelling. Examples of additives questioned.

Topic 13. Legislation on food additives. Positive lists. Directives, royal decrees and regulations.

#### **6. Practicals**

##### **PRACTICAL 1.**

**USING OF HYDROCOLLOIDS.** Stabilization of emulsions. Synergies between hydrocolloids. Development of a product like a sweet pastry

**PRACTICAL 2. DETERMINATION OF ADDITIVES IN FOOD.** Rapid detection of preservatives and adulterants in milk. Determination of ascorbic acid (vitamin C) on flour. Determination of sulfites in meat.

**PRACTICAL 3. MAILLARD REACTION OF SUCROSE, GLUCOSE AND FRUCTOSE ON FLOUR.** Inactivation of polyphenol oxidase in apples. Variations in color intensity

**PRACTICAL 4. PREPARATION OF SWEETIES.** Preparing sweets

**PRACTICAL 5. ASSESSMENT OF PRESERVATIVE IN FOODS.** Determination of nitrate and nitrite in vegetables

**PRACTICAL 6. FOOD COLOURS.** Dyes wine. Arata assay. Determination of natural colorants. E-160a. Identifying dyes by thin layer chromatography (TLC)

**WORKLOAD**

| ACTIVITY                                     | Hours         | % To be attended |
|--|---------------|------------------|
| Theory classes                               | 25,00         | 100              |
| Laboratory practices                         | 15,00         | 100              |
| Seminars                                     | 2,00          | 100              |
| Tutorials                                    | 1,00          | 100              |
| Development of group work                    | 10,00         | 0                |
| Development of individual work               | 5,00          | 0                |
| Study and independent work                   | 10,00         | 0                |
| Readings supplementary material              | 5,00          | 0                |
| Preparation of evaluation activities         | 20,00         | 0                |
| Preparing lectures                           | 10,00         | 0                |
| Preparation of practical classes and problem | 7,50          | 0                |
| <b>TOTAL</b>                                 | <b>110,50</b> |                  |

**TEACHING METHODOLOGY**

The theoretical teaching methodology is based on the delivery of lectures along with the performance, presentation and defense of individual and collective reports. Individual study of the topics above will be strengthened by organizing tutorials. Prior to the date of tutoring, the student must have prepared the proposed activities to reinforce the learning aspects specific agenda. The seminars are group work that will include the delivery of a report on the subject of work and a public exhibition in the classroom.

During practice, students can extend and implement the knowledge. It will be distributed a booklet of practices with the necessary materials and the development of each of the perfectly organized practices. The teacher will monitor the practice, will address the doubts in the implementation and provide guidance on how to make reports, organizing results and conclusions

**EVALUATION**

- Producing, presentation and defense of works related to the contents explained and discussed in the classroom related to one of the subjects studied during the semester (coordinated seminars). Written work will be evaluated and the level of understanding of the content and skills to their exposure, advocacy and discussion. (10%).
- Make a written test to ensure knowledge and understanding of theoretical minimum content established for the subject (60%).





c) Evaluation of laboratory work by means teacher supervision, the ability to solve experimental problems and the ability to make very detailed and organized reports of experimental results. The written test will include questions about practical contents. (20%).

d) Evaluation of the work during the tutorials and the ability to solve the proposed activities (10%).

Should be obtained 4.5 points out of 10 on the written test to pass the subject.

Attendance at practices is obligatory for passing the subject except for those students that have undertaken these classes previously. Unjustified non-attendance to tutorials and coordinated seminars imply zero points in the corresponding evaluation section except for those students that have undertaken these classes in previous years.

## REFERENCES

### Basic

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### Additional

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Dickinson, E and Vliet TV (2002). Food Colloids. Biopolymers and Materials. RSC  
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Watson, D.H.(2002). Food Chemical Additives. CRP Press.

## **ADDENDUM COVID-19**

**This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council**

**English version is not available**